

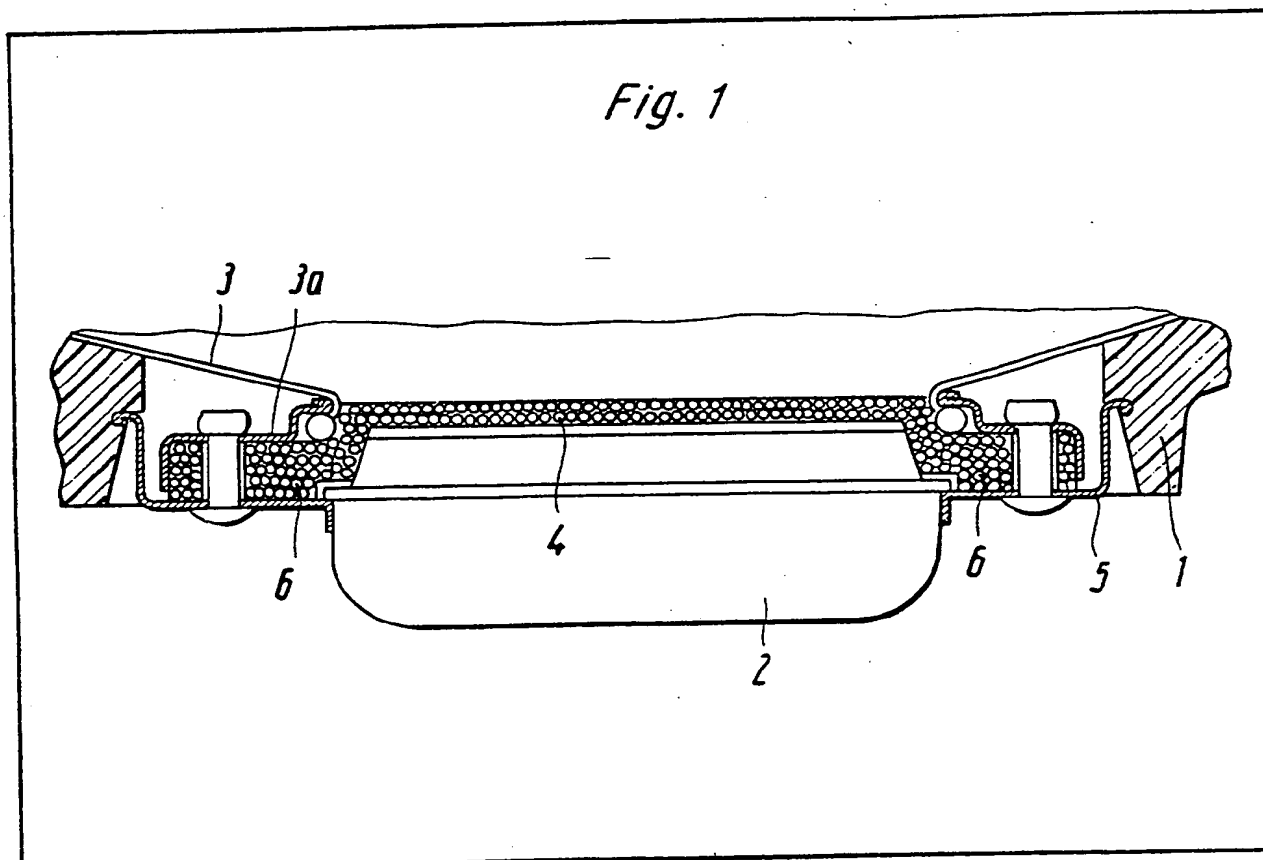
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(54) Gas Filter

(57) A filter for gas bag impact protection devices suitable for use in vehicles comprises a plurality of metal spheres (e.g. bronze or brass) sintered together to form a rigid body (4). The body may vary in thickness or comprise central and peripheral regions of differently sized spheres or incorporate a central baffle, to distribute gas from generator 2 in desired fashion over the area of the filter.

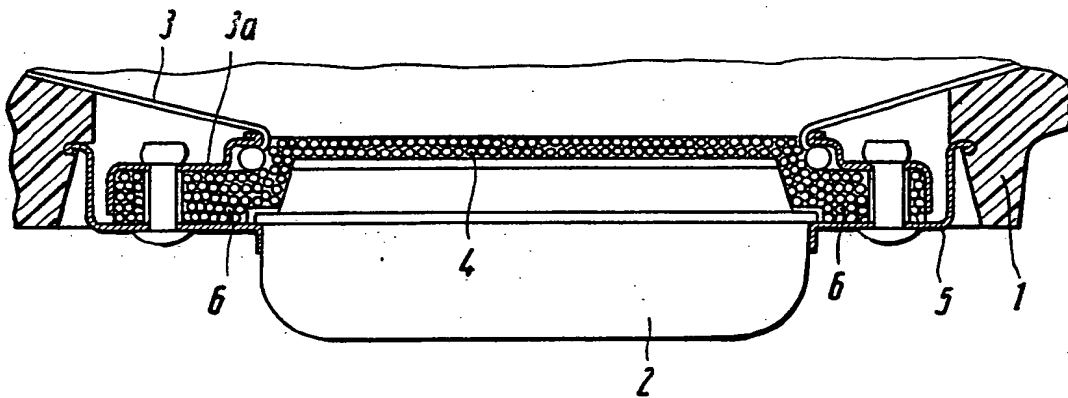


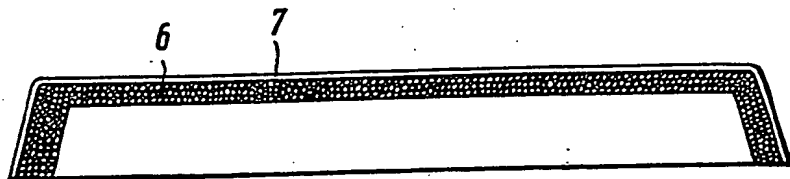
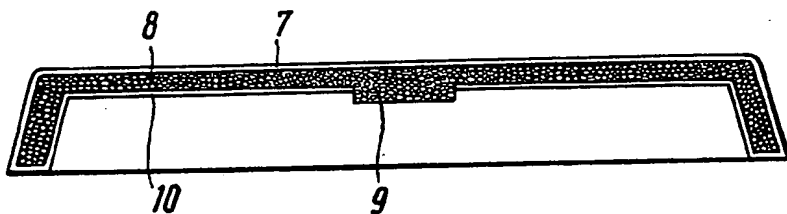
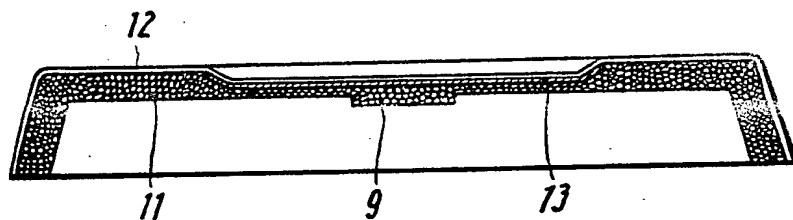
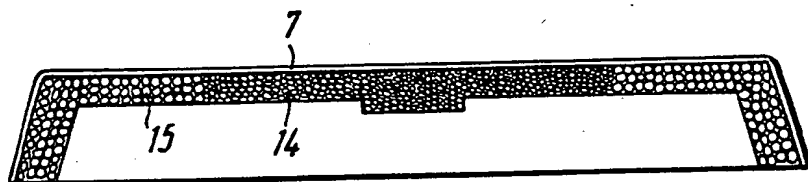
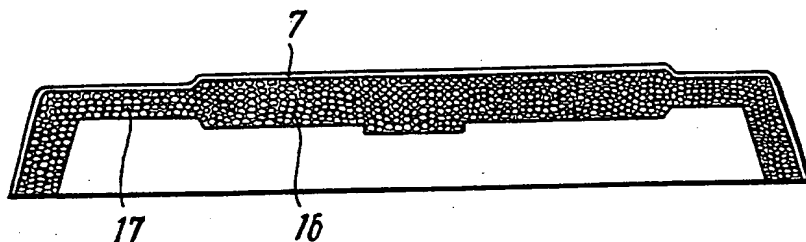
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Fig. 1



*Fig. 2**Fig. 3**Fig. 4**Fig. 5**Fig. 6*

SPECIFICATION

Filter for Gas Bag Impact Protection Devices

The present invention relates to a filter for inflatable gas bag impact protection devices, particularly those which are suitable for use in automotive vehicles.

In known gas bag impact protection devices, it is necessary to locate a filter between the gas generator and the inflatable gas bag. Such filter cools the propellant gas flowing into the gas bag to a temperature which will not damage the bag and also to retain solid particles unavoidably entrained in the propellant gas. The particles could otherwise leak into the bag and, if the bag is destroyed, enter the passenger compartment. Filters have, hitherto, been made of a metallic fibre fleece compacted into a surface body, on at least one surface of which a metal grid has been sintered.

These known filters are, from a manufacturing point of view, extremely complicated and are therefore costly to produce. This is particularly due to the considerable expenditure involved in the production of a metallic fibre fleece from a plurality of capillary wires, and in the sintering of the metallic fibre fleece to support lattices therefor. Moreover, minor local overheating can lead to melting of the fleece fibres and since there are only narrow tolerances with regard to the specific gas passage cross-sectional area, the filter becomes useless. A further disadvantage resides in that, in its original state, the fibre fleece cannot be easily shaped, so that varying of the filter to take into account different functional requirements of the impact protection device, such as the directional control of the gas flow within the device or the varying of the cooling characteristics, is virtually impossible.

The present invention seeks to provide a filter for gas bag impact protection devices which is simple to produce and permits adaptation of the device to given functional requirements in a relatively simple manner.

According to the present invention, there is provided a filter for gas bag impact protection devices suitable for use in vehicles wherein the filter is comprised of a plurality of metal spheres, the spheres being sintered together to form a rigid shaped or moulded body.

The spherical material utilised for producing a filter in accordance with the present invention can be simply and cheaply produced. Moreover, such spherical material can be readily processed by sintering because the spheres have a greater mass than the corresponding fleece fibres and are therefore less liable to overheat. Fusing, which reduces the flow cross-section and is a disadvantage if a fibre fleece is employed, do not occur. Moreover, due to the sintering of the spherical material, an inherently adequately stable shaped body is formed which basically does not need the fitting of a lattice coating thereover.

For safety reasons, it may be desirable after installing the safety device, to apply to at least the

face of the filter directed towards the gas bag, a retaining sieve or filter to prevent any particles of the filter from becoming detached. The provision of this sieve or filter does not, however necessitate a separate manufacturing step since it, may be sintered onto the filter body during the sintering together of the spherical material.

A further advantage of a filter in accordance with the invention is that it permits a wide range of modifications to be made in a simple manner and with little additional expenditure or difficulty. Thus, a device in accordance with the present invention can be adapted to given functional requirements of the impact protection device. For example, a metal shim or baffle may be included in the filter prior to sintering so as, in use, to preclude the passage of gas into particular areas of the filter. By using spheres of differing diameters, the gas flow path cross-section may be modified and adapted to given conditions within a relatively wide range. By selecting the diameter of the spheres to be a particular fraction of the thickness of the filter body or by reducing the path of the gas, a variation in the cooling effect produced by the filter may be obtained.

By varying the filter thickness and/or by varying the diameter of the spheres in different regions of the filter a specific desired manner of gas conduction may be attained. Basically, the filter may be made of spheres of any suitable sinterable material. The spherical material and any inserts sintered therein are, however, preferably made from a bronze alloy, which has proved to be an extremely useful material for the desired purpose.

The invention will be further described, by way of example with reference to the accompanying drawings, in which:—

Fig. 1 is a view, partially in section, of a gas bag protective device including a filter in accordance with the present invention and

Figs. 2 to 7 show different embodiments of a filter in accordance with the invention.

In Fig. 1 there is shown a steering wheel 1 for automotive vehicles. The wheel 1 defines a bowl or dish in which a gas bag protective device is retained in a manner which is generally known. The protective device comprises a pressure gas generator 2, a gas bag 3 and a filter 4 located between the generator 2 and the bag 3. The device is mounted in the steering wheel bowl or dish by means of a support member 5. The filter 4 comprises a shaped or moulded body made of a plurality of spherical members. The spheres may be made of any suitable sinterable metal but are preferably made of a brass alloy. The spherical members are sintered together in a mould, under pressure, to form the shaped or moulded body. A filter in accordance with the invention may be made in any desired shape and, as shown in Fig. 1, can include securing flanges 6 formed integrally with the shaped or moulded body. Separate securing elements are thus not required. Moreover, by means of a retaining plate 3a the body simultaneously constitute a securing member for the gas bag 3.

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 5 Figs. 2 to 6 show various embodiments of a filter in accordance with the invention. Thus, Fig. 2 shows a flat filter 6 made of a plurality of individual spheres of constant diameter throughout which has an additional sieve or filter layer 7 on its external surface. In Fig. 3, a filter 8 is shown which has a spacer 9 sintered thereon, and is provided with sieve or filter layers 7 and 10 on both its outer and inner surfaces.

10 Fig. 4 shows a distribution filter 11 having a sieve or filter layer 12 similar to the layers 7 and 10 and also has an inserted baffle member 13 made of a metal plate. This latter ensures gas flow into the outer regions of the filter. A further
 15 embodiment of a distribution filter is shown in Fig. 5. In this embodiment the gas flow distribution occurs by varying the specific cross-sectional flow area in different regions of the filter. Thus, as shown in Fig. 5, the region or zone 14 of the filter
 20 is formed of spheres having a smaller diameter than those used in the outer region 15. Similarly, the gas flow distribution can be varied by providing a filter as shown in Fig. 6 by using
 25 spheres of a constant diameter throughout but the thickness of the filter layer is varied as can be seen by comparing the thickness in the regions 16 and 17.

Claims

1. A filter for gas bag impact protection devices

30 suitable for use in vehicles wherein the filter is comprised of a plurality of metal spheres, the spheres being sintered together to form a rigid shaped or moulded body.

2. A filter as claimed in claim 1; wherein the spheres are made of a bronze alloy.

35 3. A filter as claimed in claim 1 or 2, wherein the shaped or moulded filter body is provided, on at least one face, with a support sieve or filter formed from spheres of the same
 40 metallic material, which sieve or filter is sintered onto the filter body.

4. A filter as claimed in any one of claims 1 to 3, wherein a baffle member is inserted, by sintering, shaped or moulded body so as to prevent the
 45 passage of gas over a part of the cross-section of the body.

5. A filter as claimed in any one of claims 1 to 3, wherein the shaped or moulded body has a thickness which varies from region to region
 50 thereof.

6. A filter as claimed in any one of claims 1 to 3, wherein the shaped or moulded body is divided into two or more regions, different regions being formed from spheres of different diameter.

55 7. A filter for gas bag impact protection devices, constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in any one of the accompanying drawings.